

WHAT IS CLAIMED IS:

1. A signal line drive circuit provided with a reference voltage chooser circuit for choosing one of incoming voltages in accordance with tones represented by an image signal to output the chosen voltage as a signal line drive signal, comprising

a reference voltage line directly transmitting a first reference voltage supplied by external reference voltage supply means to the reference voltage chooser circuit.

2. A signal line drive circuit provided with a reference voltage chooser circuit for choosing, in accordance with tones represented by an image signal, a voltage derived from first reference voltages supplied to the signal line drive circuit to output a signal line drive signal, wherein:

a second reference voltage produced by voltage division from at least two of the first reference voltages is supplied to the reference voltage chooser circuit via a buffer circuit having a high input impedance and a low output impedance; and

the first reference voltages are directly supplied to the reference voltage chooser circuit in which a

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3. A signal line drive circuit provided with a reference voltage chooser circuit for choosing, in accordance with tones represented by an image signal, a voltage derived from first reference voltages supplied to the signal line drive circuit to output a signal line drive signal, wherein:

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the reference voltage chooser circuit chooses one of incoming voltages to output a signal line drive signal in accordance with the tones represented by the image signal.

7. A signal line drive circuit, comprising:  
a sampling circuit for sampling an image signal;  
a reference voltage chooser circuit for choosing a  
reference voltage in accordance with the sampled signal

to output a signal line drive signal; and

a decoder circuit for controlling the reference voltage chooser circuit in accordance with the sampled signal,

wherein:

the decoder circuit is controlled through a third control signal to change a decoder table; and

the reference voltage chooser circuit changes a reference voltage choosing pattern.

8. The signal line drive circuit as defined in claim 7, wherein

the decoder circuit is controlled in accordance with the number of tones represented by the image signal.

9. A signal line drive circuit including:

a sampling circuit for sampling an image signal;

a voltage divider circuit for producing a second reference voltage by voltage division from at least two of first reference voltages supplied to the signal line drive circuit; and

a reference voltage chooser circuit for choosing a voltage derived from the first reference voltages to output a signal line drive signal,

the second reference voltage being supplied to the

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reference voltage chooser circuit via a buffer circuit having a high input impedance and a low output impedance,

the reference voltage chooser circuit choosing one of incoming voltages,

the signal line drive circuit including a decoder circuit for controlling the reference voltage chooser circuit in accordance with the sampled signal and outputting the signal line drive signal in accordance with tones represented by the sampled signal,

said signal line drive circuit comprising at least any one of:

(i) a first switch to cut off power supply to the buffer circuit;

(ii) a second switch interposed between the first reference voltages and the voltage divider circuit to cut off the reference voltage supplied to the voltage divider circuit; and

(iii) a decoder circuit for changing a decoder table to change a pattern according to which the reference voltage chooser circuit chooses a reference voltage,

wherein

at least any one of the first switch, the second switch, and the decoder table for the decoder circuit is/are controlled for closure/opening or changed in accordance with the number of tones represented by the

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image signal.

10. A signal line drive circuit including:

a sampling circuit for sampling an image signal;

a voltage divider circuit for producing a second reference voltage by voltage division from at least two of first reference voltages supplied to the signal line drive circuit; and

a reference voltage chooser circuit for choosing a voltage derived from the first reference voltages to output a signal line drive signal,

the second reference voltage being supplied to the reference voltage chooser circuit via a buffer circuit having a high input impedance and a low output impedance,

the reference voltage chooser circuit choosing one of incoming voltages,

the signal line drive circuit including a decoder circuit for controlling the reference voltage chooser circuit in accordance with the sampled signal and outputting the signal line drive signal in accordance with tones represented by the sampled signal,

said signal line drive circuit comprising:

a first switch to cut off power supply to the buffer circuit;

a second switch interposed between the first

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reference voltages and the voltage divider circuit to cut off the reference voltage supplied to the voltage divider circuit; and

a decoder circuit for changing a decoder table to change a pattern according to which the reference voltage chooser circuit chooses a reference voltage,

wherein

if the number of tones represented by the image signal is less than or equal to the number of the first reference voltages, the first switch and the second switch are both opened, and the decoder circuit switches the decoder table to one of the decoder tables that matches the number of tones represented by the image signal.

11. An image display device, comprising:

pixels arranged in a matrix form;

signal lines connected to the pixels; ✓

scan lines connected to the pixels; ✓

a scan signal line drive circuit for supplying scan signals to the scan lines for a vertical scan; and ✓

a signal line drive circuit for supplying signal line drive signals to the signal lines, the signal line drive circuit including a reference voltage chooser circuit for choosing, in accordance with tones

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represented by an image signal, a voltage derived from incoming first reference voltages to output the chosen voltage,

wherein:

a second reference voltage produced by voltage division from at least two of the first reference voltages is supplied to the reference voltage chooser circuit via a buffer circuit having a high input impedance and a low output impedance; and

the first reference voltages are directly supplied to the reference voltage chooser circuit in which a voltage is chosen from input voltages to output a signal line drive signal in accordance with the tones represented by the image signal.

12. A portable apparatus, comprising an image display device as defined in claim 11.

13. An image display device, comprising:

pixels arranged in a matrix form;

signal lines connected to the pixels;

scan lines connected to the pixels;

a scan signal line drive circuit for supplying scan signals to the scan lines for a vertical scan; and

a signal line drive circuit for supplying signal

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line drive signals to the signal lines, the signal line drive circuit including a reference voltage chooser circuit for choosing, in accordance with tones represented by an image signal, a voltage derived from incoming first reference voltages to output the chosen voltage,

wherein:

a second reference voltage produced by voltage division from at least two of the first reference voltages is supplied to the reference voltage chooser circuit via a buffer circuit having a high input impedance and a low output impedance;

among power supply voltages supplied to the signal line drive circuit, at least a power supply voltage supplied to the buffer circuit is supplied to the buffer circuit via a first switch controlled through a first control signal; and

the reference voltage chooser circuit chooses one of incoming voltages to output the signal line drive signal in accordance with the tones represented by the image signal.

14. A portable apparatus, comprising an image display device as defined in claim 13.

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15. An image display device, comprising:
- pixels arranged in a matrix form;
  - signal lines connected to the pixels;
  - scan lines connected to the pixels;
  - a scan signal line drive circuit for supplying scan signals to the scan lines for a vertical scan; and
  - a signal line drive circuit for supplying signal line drive signals to the signal lines, the signal line drive circuit including: a voltage divider circuit for producing a second reference voltage by voltage division from at least two of incoming first reference voltages; and a reference voltage chooser circuit for choosing an output in accordance with tones represented by an image signal,
- wherein
- a second switch controlled through a second control signal is interposed between the first reference voltages and the voltage divider circuit.

16. A portable apparatus, comprising an image display device as defined in claim 15.

17. An image display device, comprising:
- pixels arranged in a matrix form;
  - signal lines connected to the pixels;

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scan lines connected to the pixels;

a scan signal line drive circuit for supplying scan signals to the scan lines for a vertical scan; and

a signal line drive circuit including: a sampling circuit for sampling an image signal; a reference voltage chooser circuit for choosing an output in accordance with tones represented by an image signal; and a decoder circuit for controlling the reference voltage chooser circuit in accordance with the sampled signal, the reference voltage chooser circuit supplying signal line drive signals to the signal lines,

wherein:

the decoder circuit is controlled through a third control signal to change a decoder table; and

the reference voltage chooser circuit changes a reference voltage choosing pattern.

18. A portable apparatus, comprising an image display device as defined in claim 16.

19. An image display device, comprising:

pixels arranged in a matrix form;

signal lines connected to the pixels;

scan lines connected to the pixels;

a scan signal line drive circuit for supplying scan

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signals to the scan lines for a vertical scan; and

a signal line drive circuit including: a voltage divider circuit for producing a second reference voltage by voltage division from at least two of incoming first reference voltages; a reference voltage chooser circuit for choosing a voltage in accordance with tones represented by an image signal to output the chosen voltage; a sampling circuit for sampling the image signal; and a decoder circuit for controlling the reference voltage chooser circuit in accordance with the sampled signal, the second reference voltage being supplied to the reference voltage chooser circuit via a buffer circuit having a high input impedance and a low output impedance, the reference voltage chooser circuit choosing one of incoming voltages, the signal line drive circuit supplying signal line drive signals to the signal lines in accordance with tones represented by the image signal sampled by the sampling circuit,

said signal line drive circuit comprising at least any one of:

(i) a first switch to cut off power supply to the buffer circuit;

(ii) a second switch interposed between the first reference voltages and the voltage divider circuit to cut off the reference voltage supplied to the voltage divider

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circuit; and

(iii) a decoder circuit for changing a decoder table to change a pattern according to which the reference voltage chooser circuit chooses a reference voltage,

wherein

at least any one of the first switch, the second switch, and the decoder table for the decoder circuit is/are controlled for closure/opening or changed in accordance with the number of tones represented by the image signal.

20. The image display device as defined in claim 19, further comprising a setup circuit for controlling at least any one of the first switch, the second switch, and the decoder circuit in accordance with a change in the number of tones represented by the image signal, so as to switch between drive mode arbitrarily.

21. A portable apparatus, comprising an image display device as defined in claim 19.

22. An image display device including:

pixels arranged in a matrix form;

signal lines connected to the pixels;

scan lines connected to the pixels;

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a scan signal line drive circuit for supplying scan signals to the scan lines for a vertical scan; and

a signal line drive circuit including: a voltage divider circuit for producing a second reference voltage by voltage division from at least two of incoming first reference voltages; a reference voltage chooser circuit for choosing a voltage in accordance with tones represented by an image signal to output the chosen voltage; a sampling circuit for sampling the image signal; and a decoder circuit for controlling the reference voltage chooser circuit in accordance with the sampled signal, the second reference voltage being supplied to the reference voltage chooser circuit via a buffer circuit having a high input impedance and a low output impedance, the reference voltage chooser circuit choosing one of incoming voltages, the signal line drive circuit supplying signal line drive signals to the signal lines in accordance with tones represented by the image signal sampled by the sampling circuit,

said image display device comprising:

a first switch to cut off power supply to the buffer circuit;

a second switch interposed between the first reference voltages and the voltage divider circuit to cut off the reference voltage supplied to the voltage divider

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a decoder circuit for changing a decoder table to change a pattern according to which the reference voltage chooser circuit chooses a reference voltage;

if the number of tones represented by the image signal is less than or equal to the number of the first reference voltages, the first switch and the second switch are both opened, and the decoder circuit switches the decoder table to one of the decoder tables that matches the number of tones represented by the image signal.

23. The image display device as defined in claim 22, further comprising a setup circuit for controlling at least any one of the first switch, the second switch, and the decoder circuit in accordance with a change in the number of tones represented by the image signal, so as to switch between drive mode arbitrarily.

24. A portable apparatus, comprising an image display device as defined in claim 22.